UNITED STATES PATENT AND TRADEMARK OFFICE

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09/493,673	01/28/2000	Wilson Wai Shun Chan	50277-383 OID 1999-921-02	2527

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SAN JOSE, CA 95125	2172	16

DATE MAILED: 01/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _16 October 2003_.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-7 and 15-28_ is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _5 and 26_ is/are allowed.

6)☒ Claim(s) _1-4,6,7,15-25,27 and 28_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _16 October 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
37 CFR 1.78.

     a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _15_.

4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: .

DETAILED ACTION

1.   Applicant has amended claim 1, 5, canceled claims 8-14 and added claims 22-28

in the amendment filed on 10/16/03. Claims 1-7, 15-28 are pending in this Office

Action.

Applicant's arguments filed 10/16/03 have been fully considered but they are not

persuasive.

Applicant argued that Dasgupta does not teach the claimed limitation "during the

transfer time interval, a receiving node receiving new lock requests, wherein said

receiving node is one of the first master node and the second master node". Dasgupta

teaches that that node 101-1 includes local shared memory segment, which stores

process information, lock structures, request/ownership queues, and information about

local processes that request or own remote locks on processing nodes 101-1 through

101-4. Remote lock request received by processing 101-1 via diagrams generated by

one or more of the other processing nodes 101-2 through 101-4. Within each

processing node 101-1 through 101-4, many remote lock requests can be processed in

parallel. A more optimal schema would require the DLM shared library to have the

capability of directly sending the lock directly to the master node over a network. Each

resource and its corresponding locks are mastered on a specific node in the cluster.

The hashing function has the following specific property for any current cluster

membership, the hashing function guarantees that the mastership of resources will be

evenly distributed amongst the members. The movement of resources occurs in a way

that preserves. This property requires a minimal movement of resources, thus helping

reduce the time interval required to relocate resources and locks. The above information

shows that the lock requests received by nodes 101-1 are processed during time

interval. Since the system does not indicate whether the lock requests are old or new,

thus, the lock requests received by nodes 101-1 may be the new lock requests. Node

101-1 is a master node of nodes 101-2 through 101-4 within clustered system. Node

101-1 is represented as a receiving node. Node 101-2 is represented as first master

node. Node 101-3 is represented as second master node (col. 4, lines 65-67; col. 5,

lines 5-80; col. 8, lines 10-50).

Applicant argued that Shrivastava does not teach the claimed limitation

"receiving acknowledgment at the first master node from other active nodes in the

cluster". Shrivastave teaches that the system e.g., 601-60n in the cluster 58 have the

same view of cluster membership, and in the event that one system detects a

communication failure with another system, the detecting system broadcasts a

message to the cluster causing other members to verify their view of the current cluster

membership. Each node knows which nodes own which resources and groups. A

node can make request that wishes to replicate modifications made to some set of

resources to the master node. A master node is the node that owns a resource or

group. Thus, whenever, nodes in a cluster send requests to the master node that

means the first master node receives acknowledgements from nodes in a cluster (col.

5, lines 45-51; col. 7, line 67, col. 8, lines 1-5).

Applicant argued that Shrivastava does not teaches "said acknowledgments

indicating that said other active nodes have been informed that said second master

node is assuming responsibility for mastering said one or more resources".

Shrivastava teaches that system e.g., 601-60n in the cluster 58 have the same view of

cluster membership, and in the event that one system detects a communication failure

with another system, the detecting system broadcasts a message to the cluster

causing other members to verify their view of the current cluster membership. After the

master node determined to be the node 603, the request node 602 forwards the

transaction request to the master node 603. The master node 603 forwards the

transaction request to the GLUP locker node. Since each node knows which nodes

own which resources and groups, thus, the system has included acknowledgments

indicating to nodes in cluster 58, that node 603 is assuming responsibility for mastering

one or more resources (col. 5, lines 45-51; col. 8, lines 60-65; col. 9, lines 3-5).

Applicant argued that Shrivastava does not teach the claimed limitation "sending

broadcast message to all other nodes in the cluster that the second master node is a

new master node for resources associated with the hash value range". However,

Dasgupta teaches redistributing of the master ship of system resources among active

processing nodes within a clustered system. As shown in fig. 3, six hash buckets and

their associated resources initially assigned as follows to three nodes such as bucket 1

through 2 are assigned to node 3 (col. 10, lines 30-45). Shrivastava teaches system

e.g., 601-60n in the cluster 58 have the same view of cluster membership, and in the

event that one system detects a communication failure with another system, the

detecting system broadcasts a message to the cluster causing other members to verify

their view of the current cluster membership. Each node knows which nodes own

which resources and groups.   After the master node determined to be the node 603, the request node 602 forwards the transaction request to the master node 603. The master node 603 forwards the transaction request to the GLUP locker node 601. This information shows that the system has broadcasted a message indicating that node 603 is a master node, to node 601 and 602. Thus, each node knows the master node 603. The node 603 is represented as the second master node (col. 5, lines 45-51; col. 8, lines 60-65; col. 9, lines 3-5).

Applicant argued that Shrivastava does not teach the claimed limitation "sending an acknowledgment to the first master node in response to the broadcast message, said acknowledgment indicating that said third node has been informed that said second master node is assuming responsibility for mastering said one or more resources". Dasgupta teaches that as if a particular node is fully quiesced with respect to another node, it will send to it only those resources/locks that were mastered from this node to the other node. Resources are associated with hash buckets from 1 through 6. Thus, when this node transfers resources to the other node, the hash buckets from 1 through 6 is re-mapped to the other node too (col. 8, lines 55-60; col. 10, lines 35-40). Shrivastava teaches systems e.g., 601-60n in the cluster 58 have the same view of cluster membership, and in the event that one system detects a communication failure with another system, the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership.   Each node knows which nodes own which resources and groups. After the master node determined to be the node 603, the request node 602 forwards

the transaction request to the master node 603. The master node 603 forwards the

transaction request to the GLUP locker node 601. This information shows that nodes

601 and 602 know the node 603, which is a master node. The node 603 is

represented as the second master node (col. 5, lines 45-51; col. 8, lines 60-65; col. 9,

lines 3-5).

For the above reason, examiner believed that rejection of the last office action

was proper.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Dasgupta (USP 5612865).

As to claim 1, Dasgupta teaches the claimed limitations:

"establishing a first master node as master for one or more resources in

response to a hash value range being mapped to said first master node" as shown in

fig. 3, six hash buckets are associated with resources initially assigned as follows to

three nodes, numbered 1 through 3, within a three-node cluster: buckets 1 through 2

are assigned to node 3. If a particular node is fully quiesced with respect to another

node, it will send to it only resources/locks that were remastered from this node to the

other node. This information shows that the other node is established as a master

node. The other node can be Node 3 (col. 10, lines 35-50; col. 8, lines 60-65) "wherein

the hash value range is associated with said one or more resources by a hash function"

as (col. 8, lines 25, lines 25-27; col. 10, lines 36-42);

"transferring responsibility for mastering said one or more resources from the first

master node to a second master node during a transfer time interval" as the hashing

function has the following specific property for any current cluster membership, the

hashing function guarantees that the mastership of resources will be evenly distributed

amongst the members. The movement of resources occur in a way that preserves. This

property requires a minimal movement of resources, thus helping reduce the time

interval required to relocate resources and locks. Once a new cluster is formed, the

hashing function is used to evaluate the hash vector, which defines the mastership of

DLM resource. If a particular node is fully quiesced with respect to another node, it will

send to it only resources/locks that were remastered from this node to the other node

and vice versa. This node is represented as first master node. The other node is

represented as the second master node. The above information implies that the first

master node moves or relocates its resources/locks to the second master node during

the time interval (col. 8, lines 20-60).

Dasgupta does not explicitly teach the claimed limitations "during the transfer

time interval, a receiving node receiving new lock requests, wherein said receiving node

is one of the first master node and the second master node; and during the tranfer time

interval, processing lock requests". However, Dasgupta teaches that node 101-1

includes local shared memory segment, which stores process information, lock

structures, request/ownership queues, and information about local processes that

request or own remote locks on processing nodes 101-1 through 101-4. Remote lock

request received by processing 101-1 via datagrams generated by one or more of the

other processing nodes 101-2 through 101-4. Within each processing node 101-1

through 101-4, many remote lock requests can be processed in parallel. A more

optimal schema would require the DLM shared library to have the capability of directly

sending the lock directly to the master node over a network. Each resource and its

corresponding locks are mastered on a specific node in the cluster. The hashing

function has the following specific property for any current cluster membership, the

hashing function guarantees that the mastership of resources will be evenly distributed

amongst the members. The movement of resources occur in a way that preserves. This

property requires a minimal movement of resources, thus helping reduce the time

interval required to relocate resources and locks. The above information shows that the

lock requests received by nodes 101-1 are processed during time interval. Since the

system does not indicate whether the lock requests are old or new, thus, the lock

requests received by nodes 101-1 may be the new lock requests. Node 101-1 is a

master node of nodes 101-2 through 101-4 within clustered system. Node 101-1 is

represented as a receiving node. Node 101-2 is represented as first master node.

Node101-3 is represented as second master node (col. 4, lines 65-67; col. 5, lines 5-80;

col. 8, lines 10-50).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Dasgupta's teaching of processing remote lock

requests received at node 101-1 in clustered system and requiring a minimal movement

of resources, thus helping reduce the time interval required to relocate resources and

locks in order to prevent deadlock or many users access resources at the same time, to

increase throughput of concurrently executing processes to selectively lockable data

resources.

As to claim 22, recites the same limitations as referred to claim 1. Therefore, it is

rejected under the same rational.

4.   Claims 2, 4, 6, 15, 17-19, 21 and 23, 25 and 27 are rejected under 35 U.S.C.

103(a) as being unpatentable over Dasgupta (USP 5612865) in view of Shrivastava et

al (or hereinafter "Shrivastava") (USP 6449734).

As to claim 2, Dasgupta teaches the claimed limitation "re-mapping the hash

value range to the second master node at the first master node" as (col. 10, lines 35-

50);

"sending initial lock information resident on the first master node at a start of the

transfer time interval to the second master node" as (col. 8, lines 1-50).

Dasgupta does not explicitly teach the claimed limitation "receiving

acknowledgments at the first master node from other active nodes in the cluster; said

acknowledgements indicating that said other active nodes have been informed that

said second master node is assuming responsibility for mastering said one or more resources. However, Dasgupta teaches redistribution of the management of locks to other functional nodes of the new clusters (col. 3, lines 45-50).

Shrivastava teaches the claimed limitations:

"receiving acknowledgments at the first master node from other active nodes in the cluster" as systems e.g., 601-60n in the cluster 58 have the same view of cluster membership, and in the event that one system detects a communication failure with another system, the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership. Each node knows which nodes own which resources and groups. A master node is the node that owns a resource or group. This information shows that each node has received other active nodes in cluster at a master node. The detecting system can be the node 604, which is represented as the first master node (col. 5, lines 45-51);

"said acknowledgements indicating that said other active nodes have been informed that said second master node is assuming responsibility for mastering said one or more resources" as system e.g., 601-60n in the cluster 58 have the same view of cluster membership, and in the event that one system detects a communication failure with another system, the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership. Each node knows which nodes own which resources and groups. After the master node determined to be the node 603, the request node 602 forwards the transaction request to the master node 603. The master node 603 forwards forwards the transaction

request to the GLUP locker node 601. This information shows that the system has broadcasted a message indicating that node 603 is a master node, to node 601 and 602. Thus, each node knows the master node 603. The node 603 is represented as the second master node (col. 5, lines 45-51; col. 8, lines 60-65; col. 9, lines 3-5).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Shrivastava's teaching of the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership. Each node knows which nodes own which resources and groups. Thus, the request node 602 forwards the transaction request to the master node 603 to Dasgupta's system in order to maintain processing data structures in logical and coherent manner and allow the distribution of processes to be managed in a cross platform environment consistently.

As to claim 4, Dasgupta teaches the claimed limitations:

"receiving initial lock information at the second master node" as each resource and its corresponding locks is mastered on a specific node in cluster (col. 8, lines 9-11), "said initial lock information resident on the first master node at a start of the transfer time interval" as relocating locks in interval time, sending resources/locks from one node to other node when one node is fully quiesced with respect to another node. This information implies that locks residents on one node at starts of relocate or send time interval (col. 8, lines 45-60).

Dasgupta does not explicitly teach the claimed limitation "sending a broadcast

message to all other nodes in the cluster that the second master node is a new master

node for resources associated with the hash value range". However, Dasgupta

teaches redistributing of the master ship of system resources among active processing

nodes within a clustered system. As shown in fig. 3, six hash buckets and their

associated resources initially assigned as follows to three nodes such as bucket 1

through 2 are assigned to node 3 (col. 10, lines 30-45). Shrivastava teaches that the

detecting system broadcasts a message to the cluster cuasing other members to verify

their view of the current cluster membership. The locker node 601 gives permission for

sender 602 to broadcast its update to the other nodes in the system. If the sender

node 602 fails while an update is in progress, the clocker node 601 recognizes the

failure and re-sends the update to the other nodes in the system. The update is

uniquely tagged so that nodes which have already received the update simply ignore

the re-sent update. The locker node 601 is a re-sender node which is represented as a

second master node. The above information shows that the receiving nodes know new

sender node that sends them new update information (col. 5, lines 27-35; col. 6, lines

52-65).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Shrivastava's teaching of the detecting system

broadcasts a message to the cluster causing other members to verify their view of the

current cluster membership, and sender node 602 broadcasts its update to the other

nodes in the system to Dasgupta's system in order to maintain processing data structures in logical and coherent manner.

As to claim 6, Dasgupta teaches the claimed limitation "receiving updated lock information from the first master node at the second master node" as the hashing function has the following specific property for any current cluster membership, the hashing function guarantees that the mastership of resources will be evenly distributed amongst the members. The movement of resources occur in a way that preserves. This property requires a minimal movement of resources, thus helping reduce the time interval required to relocate resources and locks. Once a new cluster is formed, the hashing function is used to evaluate the hash vector, which defines the mastership of DLM resource. If a particular node is fully quiesced with respect to another node, it will send to it only resources/locks that were remastered from this node to the other node and vice versa. The system submits requests and modify locks within the lock database (col. 8, lines 20-60; col. 7, lines 55-60). When the system distributes locks to nodes in the clustered system, the modified locks can be distributed in master node. Thus, the system would transferred locks from one node to another node in interval time, "as wherein the transfer time interval ends at an update time of said receiving updated lock information." as modifying lock in a database and relocating locks in interval time, sending resources/locks from one node to other node when one node is fully quiesced with respect to another node. This information implies that receiving at other node occurs in interval time when one node is fully quiesced with another node and one node

transfers its locks to other node. These locks stored in nodes are updated locks from a database. Thus, it is obvious that the transfer time interval ends at an update time of sending updated lock information (col. 7, lines 55-60; col. 8, lines 45-60).

As to claim 15, Dasgupta teaches the claimed limitations:

" re-mapping a hash value range initially assigned to the first master node to the second master node" as shown in fig. 3, six hash buckets are associated with resources initially assigned as follows to three nodes, numbered 1 through 3, within a three-node cluster: buckets 1 through 2 are assigned to node 3. If a particular node is fully quiesced with respect to another node, it will send to it only resources/locks that were remastered from this node to the other node (col. 10, lines 35-50; col. 8, lines 60-65), "wherein the hash value range is associated with one or more of the shared resources by a hash function" as (col. 8, lines 25, lines 25-27; col. 10, lines 36-42).

"sending initial lock information resident on the first master node at a start of the transfer time interval to the second master node" as the hashing function has the following specific property for any current cluster membership, the hashing function guarantees that the mastership of resources will be evenly distributed amongst the members. The movement of resources occur in a way that preserves. This property requires a minimal movement of resources, thus helping reduce the time interval required to relocate resources and locks. Once a new cluster is formed, the hashing function is used to evaluate the hash vector, which defines the mastership of DLM resource. If a particular node is fully quiesced with respect to another node, it will send

to it only resources/locks that were remastered from this node to the other node and

vice versa. This node is represented as first master node. The other node is

represented as the second master node. Since time interval may include start time and

end time. Thus, moving or relocating resources/locks from the first master nodes

moves to the second master node can be at the start time of time interval (col. 8, lines

20-60).

Dasgupta does not explicitly teach the claimed limitations:

"receiving acknowledgments at the first master node from other active nodes in

the cluster; said acknowledgements indicating that said other active nodes have been

informed that said second master node is assuming responsibility for mastering said

one or more resources".

However, Shrivastava teaches the claimed limitations:

"receiving acknowledgments at the first master node from other active nodes in

the cluster" as the system e.g., 601-60n in the cluster 58 have the same view of cluster

membership, and in the event that one system detects a communication failure with

another system, the detecting system broadcasts a message to the cluster causing

other members to verify their view of the current cluster membership.   Each node

knows which nodes own which resources and groups. A node can make request that

wishes to replicate modifications made to some set of resources to the master node. A

master node is the node that owns a resource or group. Thus, whenever, nodes in a

cluster send requests to the master node that means the first master node receives

acknowledgements from nodes in a cluster (col. 5, lines 45-51; col. 7, line 67, col. 8, lines 1-5);

"said acknowledgements indicating that said other active nodes have been informed that said second master node is assuming responsibility for mastering said one or more resources" as system e.g., 601-60n in the cluster 58 have the same view of cluster membership, and in the event that one system detects a communication failure with another system, the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership. After the master node determined to be the node 603, the request node 602 forwards the transaction request to the master node 603. The master node 603 forwards the transaction request to the GLUP locker node. Since each node knows which nodes own which resources and groups, thus, the system has included acknowledgments indicating to nodes in cluster 58, that node 603 is assuming responsibility for mastering one or more resources (col. 5, lines 45-51; col. 8, lines 60-65; col. 9, lines 3-5).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Shrivastava's teaching of the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership. Each node knows which nodes own which resources and groups. Thus, the request node 602 forwards the transaction request to the master node 603 to Dasgupta's system in order to maintain processing data structures in logical and coherent manner and allow the distribution of processes to be managed in a cross platform environment consistently.

As to claim 17, Dasgupta does not explicitly teach the claimed limitation "processing lock requests received during the transfer time interval until receiving acknowledgements from all active nodes in the cluster". However, Dasgupta teaches that as the hashing function has the following specific property for any current cluster membership, the hashing function guarantees that the mastership of resources will be evenly distributed amongst the members. The movement of resources occur in a way that preserves. This property requires a minimal movement of resources, thus helping reduce the time interval required to relocate resources and locks. Once a new cluster is formed, the hashing function is used to evaluate the hash vector, which defines the mastership of DLM resource. If a particular node is fully quiesced with respect to another node, it will send to it only resources/locks that were remastered from this node to the other node and vice versa ((col. 7, lines 55-60; col. 8, lines 45-60). Shrivastava teaches that system e.g., 601-60n in the cluster 58 have the same view of cluster membership, and in the event that one system detects a communication failure with another system, the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership. Each node knows which nodes own which resources and groups. Each node knows which nodes own which resources and groups (col. 5, lines 45-51).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Shrivastava's teaching of the detecting system broadcasts a message to the cluster causing other members to verify their view of the

current cluster membership.   Each node knows which nodes own which resources

and groups to Dasgupta's system in order to maintain performing requests from nodes

consistently.

As to claim 18, Dasgupta teaches the claimed limitations:

"receiving initial lock information resident on the first master node at a start of the

transfer time interval" as relocating locks in interval time, sending resources/locks from

one node to other node when one node is fully quiesced with respect to another node.

This information implies that locks residents on one node at starts of relocate or send

time interval (col. 8, lines 45-60).

"re-mapping a hash value range initially assigned to the first master node to the

second master node, wherein the hash value range is associated with one or more of

the shared resources by a hash function" as (col. 8, lines 10-60).

Dasgupta does not explicitly teach the claimed limitation "sending a broadcast

message to all other nodes in the cluster that the second master node is a new master

node for resources associated with the hash value range". However, Dasgupta

teaches redistributing of the master ship of system resources among active processing

nodes within a clustered system. As shown in fig. 3, six hash buckets and their

associated resources initially assigned as follows to three nodes such as bucket 1

through 2 are assigned to node 3 (col. 10, lines 30-45). Shrivastava teaches system

e.g., 601-60n in the cluster 58 have the same view of cluster membership, and in the

event that one system detects a communication failure with another system, the

detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership.   Each node knows which nodes own which resources and groups.   After the master node determined to be the node 603, the request node 602 forwards the transaction request to the master node 603. The master node 603 forwards the transaction request to the GLUP locker node 601. This information shows that the system has broadcasted a message indicating that node 603 is a master node, to node 601 and 602. Thus, each node knows the master node 603. The node 603 is represented as the second master node (col. 5, lines 45-51; col. 8, lines 60-65; col. 9, lines 3-5).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Shrivastava's teaching of the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership.   Each node knows which nodes own which resources and groups.   Thus, the request node 602 forwards the transaction request to the master node 603 to Dasgupta's system in order to maintain processing data structures in logical manner and allow the distribution of processes to be managed in a cross platform environment consistently.

As to claim 19, Dasgupta teaches the claimed limitation "said instructions further causing the one or more processors to perform receiving updated lock information from the first master node" as hashing function has the following specific property for any current cluster membership, the hashing function guarantees that the mastership of

resources will be evenly distributed amongst the members. The movement of resources occur in a way that preserves. This property requires a minimal movement of resources, thus helping reduce the time interval required to relocate resources and locks. Once a new cluster is formed, the hashing function is used to evaluate the hash vector, which defines the mastership of DLM resource. If a particular node is fully quiesced with respect to another node, it will send to it only resources/locks that were remastered from this node to the other node and vice versa. The system submits requests and modify locks within the lock database (col. 8, lines 20-60; col. 7, lines 55-60). When the system distributes locks to nodes in the clustered system, the modified locks can be distributed in master node. Thus, the system would transferred locks from one node to another node in interval time, "wherein the transfer time interval ends at an update time of said receiving updated lock information" as modifying lock in a database and relocating locks in interval time, sending resources/locks from one node to other node when one node is fully quiesced with respect to another node. This information implies that receiving at other node occurs in interval time when one node is fully quiesced with another node and one node transfers its locks to other node. These locks stored in nodes are updated locks from a database. Thus, the time interval ends at an update time of sending updated lock information (col. 7, lines 55-60; col. 8, lines 45-60).

As to claim 21, Dasgupta teaches the claimed limitations:

"wherein the hash value range is associated with one or more of the shared

resources by a hash function" as (col. 10, lines 35-50; col. 8, lines 25-30);

"re-mapping the hash value range to the second master node" as if a particular

node is fully quiesced with respect to another node, it will send to it only those

resources/locks that were mastered from this node to the other node. Resources are

associated with hash buckets from 1 through 6. Thus, when this node transfers

resources to the other node, the hash buckets from 1 through 6 is re-mapped to the

other node too. This other node is represented as the second master node (col. 8, lines

55-60; col. 10, lines 35-40).

Dasgupta does not explicitly teach the claimed limitations "receiving a broadcast

message indicating that the second master node is a new master node for resources

associated with a hash value range; sending an acknowledgment to the first master

node in response to the broadcast message, said acknowledgement indicating that

said third node has been informed that said second master node is assuming

responsibility for mastering said one or more resources; and after said sending an

acknowledgment, sending subsequent lock requests for the one or more of the shared

resources to the second master node". However, Dasgupta teaches that as if a

particular node is fully quiesced with respect to another node, it will send to it only

those resources/locks that were mastered from this node to the other node. Resources

are associated with hash buckets from 1 through 6. Thus, when this node transfers

resources to the other node, the hash buckets from 1 through 6 is re-mapped to the

other node too (col. 8, lines 55-60; col. 10, lines 35-40). Shrivastava teaches systems

e.g., 601-60n in the cluster 58 have the same view of cluster membership, and in the event that one system detects a communication failure with another system, the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership.   Each node knows which nodes own which resources and groups.   After the master node determined to be the node 603, the request node 602 forwards the transaction request to the master node 603. The master node 603 forwards forwards the transaction request to the GLUP locker node 601. This information shows that nodes 601 and 602 know the node 603, which is a master node. The node 603 is represented as the second master node (col. 5, lines 45-51; col. 8, lines 60-65; col. 9, lines 3-5).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Shrivastava's teaching of the detecting system broadcasts a message to the cluster causing other members to verify their view of the current cluster membership.   Each node knows which nodes own which resources and groups.   Thus, the request node 602 forwards the transaction request to the master node 603 to Dasgupta's system in order to maintain processing data structures in logical and coherent manner and allow the distribution of processes to be managed in a cross platform environment consistently.

As to claim 23, recites the same limitations as referred to claim 2. Therefore, it is rejected under the same rational.

As to claim 25, recites the same limitations as referred to claim 4. Therefore, it is rejected under the same rational.

As to claim 27, recites the same limitations as referred to claim 6. Therefore, it is rejected under the same rational.

5.   Claims 3 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dasgupta (USP 5612865) in view of Wolff (UPS 6185601).

As to claim 3, Dasgupta teaches the claimed limitation "sending updated lock information resident on the first master node at said full acknowledgment time to the second master node" as the hashing function has the following specific property for any current cluster membership, the hashing function guarantees that the mastership of resources will be evenly distributed amongst the members. The movement of resources occur in a way that preserves. This property requires a minimal movement of resources, thus helping reduce the time interval required to relocate resources and locks. Once a new cluster is formed, the hashing function is used to evaluate the hash vector, which defines the mastership of DLM resource. If a particular node is fully quiesced with respect to another node, it will send to it only resources/locks that were remastered from this node to the other node and vice versa. The system submits requests and modify locks within the lock database (col. 8, lines 20-60; col. 7, lines 55-60). When the system distributes locks to nodes in the clustered system, the modified locks can be distributed in master node. Thus, the system transfers locks from one

node to another node in interval time, "wherein the transfer time interval ends at an

update time of said sending updated lock information" as modifying lock in a database

and relocating locks in interval time, sending resources/locks from one node to other

node when one node is fully quiesced with respect to another node. This information

implies that sending locks from one node to other node occurs in interval time when one

node is fully quiesced with another node. These locks stored in nodes are updated locks

from a database. Thus, it is obvious that the transfer time interval ends at an update

time of sending updated lock information (col. 7, lines 55-60; col. 8, lines 45-60).

Dasgupta fails to teach the claimed limitation "in response to receiving

acknowledgements from all active nodes in the cluster by a full acknowledgement time".

However, Wolff teaches at time t=0, normal client 100A is shown accessing memory

resource 118 via path 70 through over loaded server 104. At the same time, aware

client 102a is shown accessing memory resource 118 via path 70 through over loaded

server 104. At the same time, aware client 102 A is shown accessing memory resource

118, via path 74, through overloaded server 104A. At time T-1, process 102 P1,

implemented on aware client 102A, detects the overload condition of server 104A, and

access memory resource 118 via an alternate path 76 through server 106A. The

detection of an overload condition on servers 104A-106A can be made by processes

104PA and 106PA running on the servers. This information shows that the client node

receives acknowledgements from all active server nodes in the clustered system (col. 5,

lines 25-41).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Wolff's teaching of detecting the overload condition of

servers at particular time to Dasgupta's system in order to distribute requests load

among nodes on a network without conflicting.

As to claim 24, recites the same limitations as referred to claim 3. Therefore, it is

rejected under the same rational.

6.   Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Dasgupta (USP 5612865) in view of Shrivastava and further in view of Wolff (UPS

6185601).

As to claim 16, Dasgupta teaches the claimed limitations:

"sending updated lock information resident on the first master node at said full

acknowledgment time to the second master node" as the hashing function has the

following specific property for any current cluster membership, the hashing function

guarantees that the mastership of resources will be evenly distributed amongst the

members. The movement of resources occur in a way that preserves. This property

requires a minimal movement of resources, thus helping reduce the time interval

required to relocate resources and locks. Once a new cluster is formed, the hashing

function is used to evaluate the hash vector, which defines the mastership of DLM

resource. If a particular node is fully quiesced with respect to another node, it will send

to it only resources/locks that were remastered from this node to the other node and

vice versa. This node is represented as first master node. The other node is

represented as the second master node. Thus, the system would transferred locks from

one node to another node in interval time (col. 7, lines 55-60; col. 8, lines 45-60),

"wherein the transfer time interval ends at an update time of said sending updated lock

information" as modifying lock in a database and relocating locks in interval time,

sending resources/locks from one node to other node when one node is fully quiesced

with respect to another node. This information implies that sending locks from one node

to other node occurs in interval time when one node is fully quiesced with another node.

These locks stored in nodes are updated locks from a database. Thus, it is obvious that

the transfer time interval ends at an update time of sending updated lock information

(col. 7, lines 55-60; col. 8, lines 45-60).

Dasgupta does not explicitly teach the claimed limitation "in response to receiving

acknowledgements from all active nodes in the cluster by a full acknowledgement time".

However, Wolff teaches at time t=0, normal client 100A is shown accessing memory

resource 118 via path 70 through over loaded server 104. At the same time, aware

client 102a is shown accessing memory resource 118 via path 70 through over loaded

server 104. At the same time, aware client 102 A is shown accessing memory resource

118, via path 74, through overloaded server 104A. At time T-1, process 102 P1,

implemented on aware client 102A, detects the overload condition of server 104A, and

access memory resource 118 via an alternate path 76 through server 106A. The

detection of an overload condition on servers 104A-106A can be made by processes

104PA and 106PA running on the servers. This information shows that the client node

receives acknowledgements from all active server nodes in the clustered system (col. 5,

lines 25-41).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Wolff's teaching of detecting the overload condition of

servers at particular time to Dasgupta's system in order to distribute requests load

among nodes on a network without conflicting.

7.   Claims 7 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Dasgupta (USP 5612865) in view of Freitas et al (or hereinafter "Freitas") (USP

6401110).

As to claim 28, Dasgupta discloses the claimed limitation subject matter in claim

1, except the claimed limitation " lock requests include a sequence number; and said

method further comprises deleting stale requests among the updated lock information

received at the second master node, the stale requests indicated by sequence numbers

earlier than sequence numbers in lock requests already processed on the second

master node". However, Dasgupta teaches that generating lock requests on a node

and updating locks on a database.   If a particular node is fully quiesced with respect to

another node, it will send to it only resources/locks that were remastered from this node

to the other node. The system submits requests and modify locks within the lock

database (col. 8, lines 20-60; col. 7, lines 55-60; col. 4, lines 25-30). Freitas teaches

that the sequence 600 an adapter performs in response to stimuli in the form of a local

lock request input arriving at the head of the queue for a particular address range. This

information shows that each received request lock is put in a queue associated with

address range (col. 11, lines 40-45). The system deletes the lock request LQR, X, Y

from the current adapter's queue (col. 13, lines 55-60).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Freitas's teaching of putting each received request lock

in a queue for a particular address range and deleting the lock request LQR, X, Y from

the current adapter's queue in order to avoid traffic during processing multiple lock

requests and save memory space.

As to claim 28, recites the same limitations as referred to claim 7. Therefore, it is

rejected under the same rational.

8.   Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Dasgupta (USP 5612865) in view of Shrivastava et al (or hereinafter "Shrivastava")

(USP 6449734) and further in view of Freitas et al (or hereinafter "Freitas") (USP

6401110).

As to claim 20, Dasgupta discloses the claimed limitation subject matter in claim

18, except the claimed limitation "lock requests include a sequence number; and said

instructions further cause the one or more processors to perform deleting stale requests

among the updated lock information received at the second master node, the stale

requests indicated by sequence numbers earlier than sequence numbers in lock

requests already processed on the second master node". However, Dasgupta teaches

that generating lock requests on a node and updating locks on a database. If a

particular node is fully quiesced with respect to another node, it will send to it only

resources/locks that were remastered from this node to the other node. The system

submits requests and modify locks within the lock database (col. 8, lines 20-60; col. 7,

lines 55-60; col. 4, lines 25-30). Freitas teaches that the sequence 600 an adapter

performs in response to stimuli in the form of a local lock request input arriving at the

head of the queue for a particular address range. This information shows that each

received request lock is put in a queue associated with address range (col. 11, lines 40-

45). The system deletes the lock request LQR, X, Y from the current adapter's queue

(col. 13, lines 55-60).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Freitas's teaching of putting each received request lock

in a queue for a particular address range and deleting the lock request LQR, X, Y from

the current adapter's queue in order to avoid traffic during processing multiple lock

requests and save memory space.

Allowable Subject Matter

9.   Claims 5 and 26 are allowed.

        As to claims 5 and 26, none of the available prior art of record teaches or fairly

suggest wherein the broadcast message indicates that the second master node is a

new matter node for resources associated with the hash value range; re-mapping the

hash value range to the second master node at each node in said set of nodes in the

cluster; sending an acknowledgment to the first master node from each node in said set

of nodes in response to the broadcast message, said acknowledgement indicating that

said each node in said set of nodes has been informed that said second master node is

assuming responsibility for mastering said one or more resources; and after sending the

acknowledgment, said each node in said set of nodes sending subsequent lock

requests for resources associated with the hash value range to the second master

node" in specific combination as recited in claims 5 and 26.

Conclusion

10.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Contact Information

10.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Cam-Y Truong whose telephone number is (703-605-

1169). The examiner can normally be reached on Mon-Fri from 8:00AM to 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, John Breene, can be reached on (703-305-9790). The fax phone numbers

for the organization where this application or proceeding is assigned is (703) 872-9306

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is (703-305-

3900).

Cam-Y Truong

12/30/03
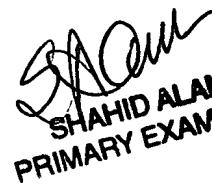
SHAHID ALAM
PRIMARY EXAMINER